Table of Contents

Tables

Figures

1.1 ENVIRONMENTAL INFORMATION

This Application for Certification (AFC) for the Salton Sea Unit 6 (SSU6) Project has been prepared in accordance with the California Energy Commission's (CEC) Power Plant Site Certification Regulations (August 2000). This Executive Summary provides an overview of the project in accordance with Appendix B, Section (a) of the regulations and includes figures taken from other chapters and sections of this AFC. This SSU6 AFC will facilitate review by the CEC, other agencies, and the public through the completion of CEC 6- and 12-Month Data Adequacy checklists found at the end of each subsection of Chapters 3 and 5 indicating the location of the material meeting the requirements for each item on the checklists.

This AFC has been prepared in accordance with CEC guidelines and provides:

- A detailed description of the proposed SSU6 Project;
- An assessment of the SSU6 Project's likely impact on the existing environment;
- Applicant-committed measures to mitigate project impacts to assure that environmental issues are properly and responsibly addressed; and,
- A discussion of compliance with applicable laws, ordinances, regulations, and standards provided within the project description and each resource section.

1.2 PROJECT OVERVIEW

The SSU6 Project is a proposed 185-megawatt (MW) net geothermal power plant consisting of a proposed geothermal Resource Production Facility (RPF), a merchant class geothermal-powered Power Generation Facility (PGF), and associated facilities in Imperial County, California. Figure 3.1-1 shows the project regionally, and Figure 3.1-2 depicts the project area, including proposed geothermal wells, transmission lines, and pipelines. The SSU6 Project will be owned by CE Obsidian Energy LLC (CEOE), also referred to as the Applicant, and operated by an affiliate of CEOE. The transmission lines will be owned and operated by the Imperial Irrigation District (IID).

Electricity generated by the SSU6 Project will be delivered to an existing IID electrical transmission line (L-Line), via the proposed 161 kV L-Line Interconnection. Additionally, the proposed IID Midway Interconnection Line will connect to the existing IID Midway Substation east of the project site (Figure 3.1-2).

The project will supply capacity and energy to California's electric market, and the Applicant has contracted over 85 percent of the plant output with the IID for a period of 20 years following project completion. The remaining energy will either be sold to the California Independent System Operator (ISO) or contracted to third parties via the IID.

The location and the configuration of the plant have been selected to best match operating needs and the available geothermal resource. A System Impact Study completed by IID concludes that no transmission upgrades are required except for certain transformer work at existing substations.

1.2.1 Salton Sea Geothermal Resources

The project is in the Salton Sea Known Geothermal Resource Area (KGRA). A KGRA is defined by the United States Geological Survey as an area in which the geology, nearby discoveries, competitive interests, or other indicia, would in the opinion of the Secretary of the Interior, engender a belief in those who are experienced in the subject matter that the prospects for extraction of geothermal steam or associated geothermal resources are good enough to warrant expenditures of money for that purpose (30 U.S.C. 1001).

A large portion of the Salton Sea KGRA is beneath the Salton Sea, and 4,808 acres of the 102,887 resource acres of the Salton Sea KGRA are currently developed. That developed acreage supports the generation of approximately 350 gross (326.4 net) MW. The proposed SSU6 Project will add 3,180 resource acres to development and support 185 net MW of additional electric power generation.

The project is within the area planned for development of geothermal resources and geothermal power plants by the County of Imperial. The Geothermal and Transmission Element was adopted by the Imperial County Board of Supervisors in 1977 but has been amended and updated. Consistent with state law, the Geothermal and Transmission Element has been incorporated into the County's General Plan. California Government Code Section 65303. The purpose of the Geothermal and Transmission Element is to "provide a comprehensive document that contains the latest knowledge about the resources, workable development technology legal requirements, policy (county, state, and federal), and implementation measures."

Furthermore, the County regulates the use of land for geothermal purposes through zoning and local land use permits. The Land Use Ordinance includes the Geothermal Overlay Zone, Title 9, Division 17, Sections 91701 and 91702 of the County's Land Use Ordinance. The project is within the County's Geothermal Overlay Zone. The Geothermal and Transmission Element and Title 9, Division 17, Sections 91701 and 91702 of the County's Land Use Ordinance are hereby incorporated by reference.

1.2.2 Project Site Selection

The SSU6 Project, as proposed, incorporates the only layout that is practicable and feasible for the generation of geothermal energy from the Salton Sea Geothermal Field (Field). The Obsidian Butte area proposed for development by the SSU6 Project contains proven reserves. The proposed well field and plant site layout provide the required energy production using the available acreage, at the closest spacing possible without undue interference between wells, while sustaining production over the life of the project.

The Salton Sea KGRA is bisected by a main blind fault that extends up into the overlying sedimentary formations and runs west-southwest to east-northeast. The main blind fault is described in Section 5.2 and illustrated on Figure 3.2-1. Reservoir temperatures increase to the northwest of the fault, while brine temperatures become cooler south of the main blind fault and cannot support geothermal energy production. Wells that gather the hot brine from which electricity is generated (production wells) would therefore be located north of the fault. Wells that inject the spent brine back into the ground (injection wells) would be located south of the main blind fault.

While Figure 3.2-1 shows graphically the basic interaction of the drainage areas of the wells, it is a simplification of the reservoir dynamics. Reservoir properties vary in lateral distance and depth, and are interdependent. The reservoir properties and production of the geothermal field have been mathematically modeled and history matched to existing data from over 10 years of production. The layout of the proposed SSU6 Project has been entered into this numerical model to forecast its effect on the reservoir and existing well fields over the life of the plant. Location, spacing, production rates, and pressure support have been balanced to provide the optimum well field for the SSU6 Project using the above criteria.

1.2.3 Project Objectives

The project objectives are:

1. To safely construct and operate a 185-MW net geothermal power plant in Imperial County and to sell power to the Imperial Irrigation District (IID) and others.
2. To assist the State in developing an indigenous and diversified energy supply, reducing California's dependence on fossil fuels.
3. To contribute to the achievement of the California Energy Commission's policy, which is to maximize the use of geothermal energy to generate electricity.
4. To provide reliability and stability to the IID grid in Imperial and Riverside Counties.
5. To further develop geothermal energy production within the Salton Sea Known Geothermal Resource Area (KGRA) in proximity to recoverable geothermal resource, water supply, and electrical transmission lines.
6. To use commercially feasible means to achieve prompt and efficient development of geothermal resources, a renewable energy source, and provide a fair return on the project investment.
7. To develop a project that will be sufficiently attractive to the investment community so that the required construction funds can be obtained.
8. To contribute to the diversification of Imperial County's economic base by providing increased employment opportunities and additional revenue sources from commercial geothermal development.

1.3 FACILITY LOCATION AND DESCRIPTION

1.3.1 Facility Location

The SSU6 Project site is in the Imperial Valley, approximately 1,000 feet southeast of the Salton Sea, within the unincorporated area of Imperial County, California. The Imperial Valley is the southwest part of the Colorado Desert that merges northwestward into the Coachella Valley near the northern shore of the Salton Sea. The region is characterized mostly by agriculture and geothermal power production. The surrounding area is dominated by agriculture. The town of Niland is approximately 7.5 miles to the northeast and the town of Calipatria is approximately 6.1 miles to the southeast of the plant site. The Sonny Bono Salton Sea Wildlife Refuge Headquarters is approximately 4,000 feet from the plant site. The Alamo River and New River are approximately 4.8 miles southwest and 2.7

miles east of the plant site, respectively. Nine geothermal power plants are within a 2-mile radius of the proposed plant site.

The project area is in the Obsidian Butte quadrant of Section 33 Southwest 4, T 11 South, R 13 East (Figure 3.1-2). The proposed power plant will be located on approximately 80 acres (Plant Site) of a 160-acre parcel. The plant site will be located on the north half of the block bounded by McKendry Road to the north, Severe Road to the west, Peterson Road to the south, and Boyle Road to the east. The construction area, including laydown and parking, is approximately 24 acres and will be located immediately adjacent and south of the plant site. A substation would also be constructed immediately south of the power plant site. The plant site, construction laydown, and substation areas are currently agricultural land. The site elevation is approximately 228 feet below sea level.

1.3.2 Facility Description

1.3.2.1 Geothermal Power Plant

The project is composed of a Resource Production Facility (RPF), a Power Generation Facility (PGF), and ancillary facilities. The geothermal brine is processed by the RPF to produce steam that powers the steam turbine in the PGF. The process flow is depicted on Figure 3.1-3. The SSU6 Project includes a high efficiency condensing steam turbine with a net plant output of 185 MW with corresponding brine production rate of 12,815 kph. Normally, the facility will be operated in a base load mode: 8,000 hours per year or more. The design of the RPF is based on crystallizer reactor clarifier technology (described in Section 3.3.2.2) to process the brine and produce turbine-quality steam.

The RPF includes all the brine and steam handling/polishing facilities from the production wellheads, through the crystallizer/clarifier system, to the injection wellheads. It also includes a solids handling system for brine solids processing, and a brine pond. Geothermal fluid will be produced from 10 production wells located on five well pads near the power plant (Figure 3.1-4). The fluid will flow through above ground pipelines to the steam handling system. At the steam handling system, the geothermal fluid will be separated from the steam phase (flashed) at successively lower pressures to produce high pressure (HP), standard pressure (SP), and low pressure (LP) steam for use in the steam turbine generator (STG). Chemically stabilized brine flows from the steam handling system into the solids handling system where solids are removed, after which the brine is suitable for injection. The spent fluid (brine) is then pumped through the injection pipelines to seven brine injection wells. All production and injection wells will be operated in accordance with California Division of Oil, Gas, and Geothermal Resources regulations.

The PGF consists of one geothermal power block, including a condensing turbine/generator set, the gas removal and abatement systems, and the heat rejection system. The PGF also includes a 161 kV switchyard and several power distributions centers. Common facilities include a control building, a service water pond, and other ancillary facilities. The steam turbine will be a multi-casing, triple-pressure, exhaust flow condensing turbine. Heat rejection for the steam turbines will be accomplished with a counterflow cooling tower with splash-type fill. The turbine generator will be nominally rated at 200 MW with a net plant capacity of 185 MW.

Figures 3.3-1A and 3.3-1B illustrate the arrangement at the RPF and PGF. Appendix F lists major equipment and significant structures required for the RPF and PGF configurations.

1.3.2.2 Site Layout

The layout of the proposed facility is illustrated in Figure 3.3-1B. Site cross sections are shown in Figures 3.3-3A and 3.3-3B. A before and after plant visual rendering is provided as Figure 3.3-6

Approximately 80 acres of land will be required to accommodate the plant facilities, which comprise of the following:

- Turbine/generator area
- RPF separator/crystallizer/scrubber/ brine clarification area
- Electrical/control building area
- Cooling towers
- Filter press area
- Electrical switchyard
- Brine pond
- Service water pond
- Stormwater detention pond
- Emissions control equipment area
- Parking area

On the plant premises there is an access road for fire equipment and facility maintenance. All dimensions are approximate.

1.3.2.2.1 Facility Support Systems

The SSU6 facility will be supported by major electrical equipment, including a 16 kV, totally enclosed water and air-cooled (TEWAC) generator to produce the power provided by two auxiliary transformers, which will be rated to supply plant startup and normal operating power requirements.

The plant is not black-start capable. Electric power from the utility system must be present to be able to bring the facility online. During normal startup, power required for auxiliaries will be provided from the utility (IID) through the STG main step-up transformer, then through the unit auxiliary transformers.

In case of a total loss of auxiliary power, or in a situation when the utility system is out of service, the emergency power for critical loads will be supplied by the standby emergency generators. These generators are sized to maintain operation of the RPF and critical loads associated with the PGF and common facilities.

The DC power supply system consists of two battery banks, each with a 125 VDC full-capacity battery charger, metering, ground detector, and distribution panel. One 125 VDC battery will be dedicated to the essential service (UPS) system. The other 125 VDC battery will feed all other station DC loads.

The facility essential service 120 VAC, single-phase, 60 Hz power source will supply AC power to essential Distributed Control System loads and to unit protection and safety systems that

require uninterruptible AC power. The essential service AC system and its DC power supply system are both designed to supply critical safety and unit protection control circuits. The essential service AC system consists of one full-capacity charger and inverter, one dedicated 125 VDC battery system, a solid-state transfer switch, a manual bypass switch, an alternative source transformer and voltage regulator, and AC panelboards.

1.3.2.2.2 Water Supply

The SSU6 Project requires an average of 293 acre-feet per year (afy) of water when operating at full plant load for uses including dilution and potable water. The expected water use for the SSU6 Project is shown in Tables 3.3-3 and 3.3-4. Average annual supply requirements will vary, depending on the capacity factor of the overall facility.

1.3.2.3 Transmission Interconnections

The proposed 16-mile double-circuit L-Line Interconnection and the proposed 15-mile single-circuit IID Midway Interconnection would be a direct inter-tie between the SSU6 Project and IID's existing L-Line and Midway substation (see Figure 3.1-2).

The transmission interconnections would be designed and constructed in accordance with "Rules for Overhead Line Construction" and other applicable state and local codes. General Order 95 (GO-95) requires a minimum conductor distance from the ground of 30 feet at 60 degrees Fahrenheit (°F), and 27 feet at maximum operating temperature. The proposed transmission conductor heights would comply with GO-95, as they are 125 feet high.

1.4 PROJECT SCHEDULE

The overall project schedule for the SSU6 Project from Limited Notice to Proceed (Procurement of Major Materials) to total Construction Site Cleanup and Demobilization is expected to take at least 26 months. Construction and startup of the power plant from the start of site mobilization to commercial operation is expected to take at least 20 months. The construction timeframe is expected to begin the first quarter of 2003 and end during the first quarter of 2005 (see Table 3.4-1 for a summary of the project schedule).

1.5 PROJECT OWNERSHIP

The power plant facility and associated well pads and pipelines would be owned by CEOE and operated by an affiliate of CEOE. The transmission lines, substation, and associated facilities would be owned and operated by IID.

1.6 ENVIRONMENTAL CONSIDERATIONS

Seventeen environmental disciplines and/or resource areas were evaluated during preparation of this AFC. The environmental assessments included identification of the affected environment, environmental consequences, mitigation measures, cumulative impacts, and applicable laws,

ordinances, regulation, and standards (LORS). The analyses are included in Section 5.0. A summary of project impacts are is listed on Table 1.6-1 at the end of this section.

1.6.1 Key Features

The Applicant has minimized potential environmental impacts through project design measures, including facility siting and incorporation of proposed mitigation measures into the proposed SSU6 Project. Table 3.7-1 lists project design measures intended to avoid or reduce potentially significant impacts. Consequently, the proposed project would not result in significant environmental impacts from construction or routine operations and emissions of criteria air pollutants from the SSU6 Project would be significantly less than a fossil-fuel power plant.

The proposed project design incorporates several environmental benefits. Many of the benefits are derived from the use of state-of-the art technology to generate electricity, coupled with the use of renewable geothermal resources. The proposed project would be ideally situated in an area identified for geothermal exploration and development by Imperial County. Nine other geothermal plants occur within a 2-mile radius of the proposed plant site, which makes the project compatible with surrounding uses from a visual and land use perspective, as well as maximizes the use of geothermal resources. The project has no sensitive biological resources or significant biological impacts after mitigation. A proposed detention pond on site will result in a zero offsite storm water discharge. Water supply will be provided by IID and the SSU6 Project would require less water than the existing agricultural uses. The proposed transmission lines would not result in electric magnetic field (EMF) impacts on residences and, except for upgrading transformers at substations, the project load will not require transmission system upgrades.

The impacts associated with construction and operation of the proposed SSU6 Project have been considered throughout the planning of this facility. In those instances where a potential for impacts to the environment has been identified, mitigation measures have been selected to minimize potential impacts.

The SSU6 Project would provide a significant tax-revenue benefit to the local economy, including applicable developer fees to the local school district, and it would meet a critical and immediate electricity generating capacity shortage in Imperial County. By using renewable geothermal resources and employing state-of-the-art air emission control technology, the project will create a highly efficient and environmentally superior source of electricity for California's energy market, including the Imperial County region.

1.7 ALTERNATIVES

The California Energy Commission (CEC) conducts its review of alternatives to satisfy the Warren-Alquist Act and the California Environmental Quality Act (CEQA). Appendix B (f) (1) of the CEC Guidelines requires a discussion of the range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. To enable this review, the criteria and objectives that led to the selection of the site and design features of the proposed SSU6 Project are provided, along with a detailed discussion of the range of alternatives considered (see Section 6.0). An alternative location to the proposed power plant

site is not practical because of the facility's dependence on the location of the geothermal resource (see Section 3.2.2). The No Project Alternative was evaluated, as was an Alternative L-Line Transmission Interconnection route that would avoid approximately 2.8 miles of a new transmission line on BLM lands. Several power generation alternatives were also considered in the initial evaluation of project alternatives.

1.8 ECONOMIC CONSIDERATIONS

The project will provide for up to 467 construction jobs over a 20-month period and 69 permanent positions throughout the life of the power plant. In addition to direct employment, the Applicant will use the services of regional firms for major maintenance and overhauls, plant supplies, and other support services throughout the life of the facility. Property tax to be paid by the SSU6 Project is estimated to be approximately $3 million annually. The proposed SSU6 plant facility will be a significant property tax contributor supporting the services and programs of the local communities.

1.9 AGENCY INTERACTION

The Applicant has strived to provide an AFC document that facilitates review by the CEC, other agencies, and the public by conferring with key regulating agencies, organizations, and municipalities, as well as with the CEC staff. Agencies consulted include:

- Bureau of Land Management
- California Regional Water Quality Control Board - Colorado River Basin Region
- United States Army Corp of Engineers
- California Air Resources Board
- California Department of Fish and Game
- United States Fish and Wildlife Service
- Imperial Irrigation District
- County of Imperial
- Imperial County Air Pollution Control District
- Department of Toxic Substances Control

This AFC reflects input from all these entities and others. Project design, information, and proposed mitigation reflects this input. The AFC includes carefully considered, comprehensive additional mitigation for compliance commitments. Specific agency contacts are provided within each subsection of Section 5.0.

Table 1.6-1
SUMMARY OF PROJECT IMPACTS

Environmental Resource	Not Significant	Less Than Significant with Mitigation/Project Features Incorporated	Significant Impact	Benefit
Air Quality		√		
Geology		√		
Agriculture/Soils		√		
Water		√		
Biology		√		
Cultural		√		
Paleontology		√		
Land Use		√		
Socioeconomics				√
Traffic	√			
Noise		√		
Visual	√			
Waste Management		√		
Hazardous Materials		√		
Public Health		√		
Worker Safety	√			